

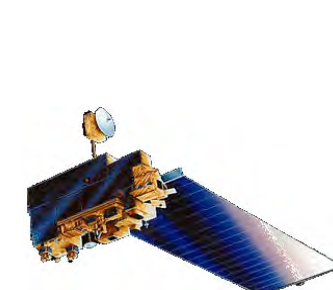
# ORNL DAAC MODIS Land Products Subsetting and Visualization Tools<sup>1</sup>

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## Introduction



Moderate Resolution Imaging Spectroradiometer (MODIS) sensor data products from NASA's Terra and Aqua satellites are used by researchers from a variety of disciplines to study global change



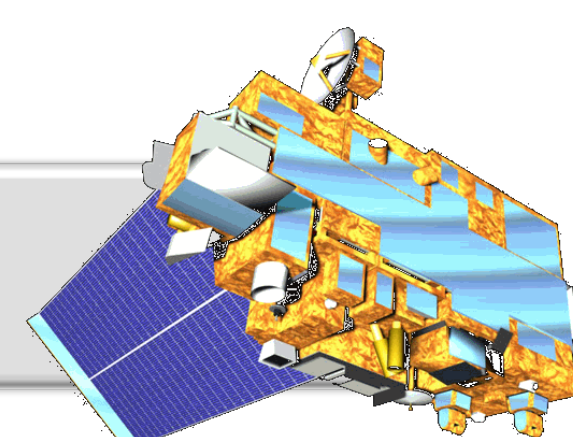
The volume of MODIS data and its complex format negatively affects usability in some cases, that scientists are using to study global change

Four years of vegetation phenology data for a 7 x 7- km area amounts to ~10 GB download of ~200 HDF-EOS files



NASA's ORNL Distributed Active Archive Center (DAAC) prepares and distributes subsets of selected MODIS Land Products at a scale useful for field researchers

Data subsets and visualizations delivered in a few minutes, as comma separated text file for spreadsheets & GIS compatible format to for GIS processing packages



## MODIS Land Products Offered

Product	Digital Object Identifier (DOI): Provisional for Collection 6 Release
Surface Reflectance	10.5067/MODIS/MOD09A1.006
Land Surface Temperature	10.5067/MODIS/MOD11A2.006
Land Cover	10.5067/MODIS/MCD12Q1.006
Vegetation Phenology	10.5067/MODIS/MCD12Q2.006
Vegetation Indices: NDVI / EVI	10.5067/MODIS/MOD13Q1.006
LAI / fPAR	10.5067/MODIS/MOD15A2.006
Net Photosynthesis	10.5067/MODIS/MOD17A2.006
Annual NPP	10.5067/MODIS/MOD17A3.006
Albedo (Model and Calculated)	10.5067/MODIS/MCD43A1.006
Reflectance – BRDF Adjusted	10.5067/MODIS/MCD43A4.006

## Subset Details

- Sinusoidal Projection
- 2000 to present
- 8-day, 16-day, and annual composite periods
- 250-m, 500-m, or 1000-m resolution (depends on product)
- Documentation provided to describe the subsetted products; links are provided to full documentation at LP DAAC

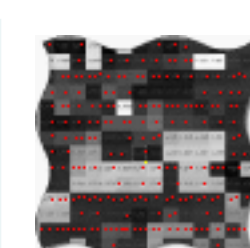
## Fixed Site Subsets

<http://daac.ornl.gov/modisfixedsite>

Over 1000 field sites worldwide (updating to 2000+ sites for Collection 6)

Subsets available as GeoTIFF (25 x 25 Km) and CSV (7 x 7 Km)

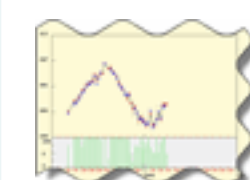
Grid Visualization for individual composite period  
**Basic Version**  
(Default QC setting)



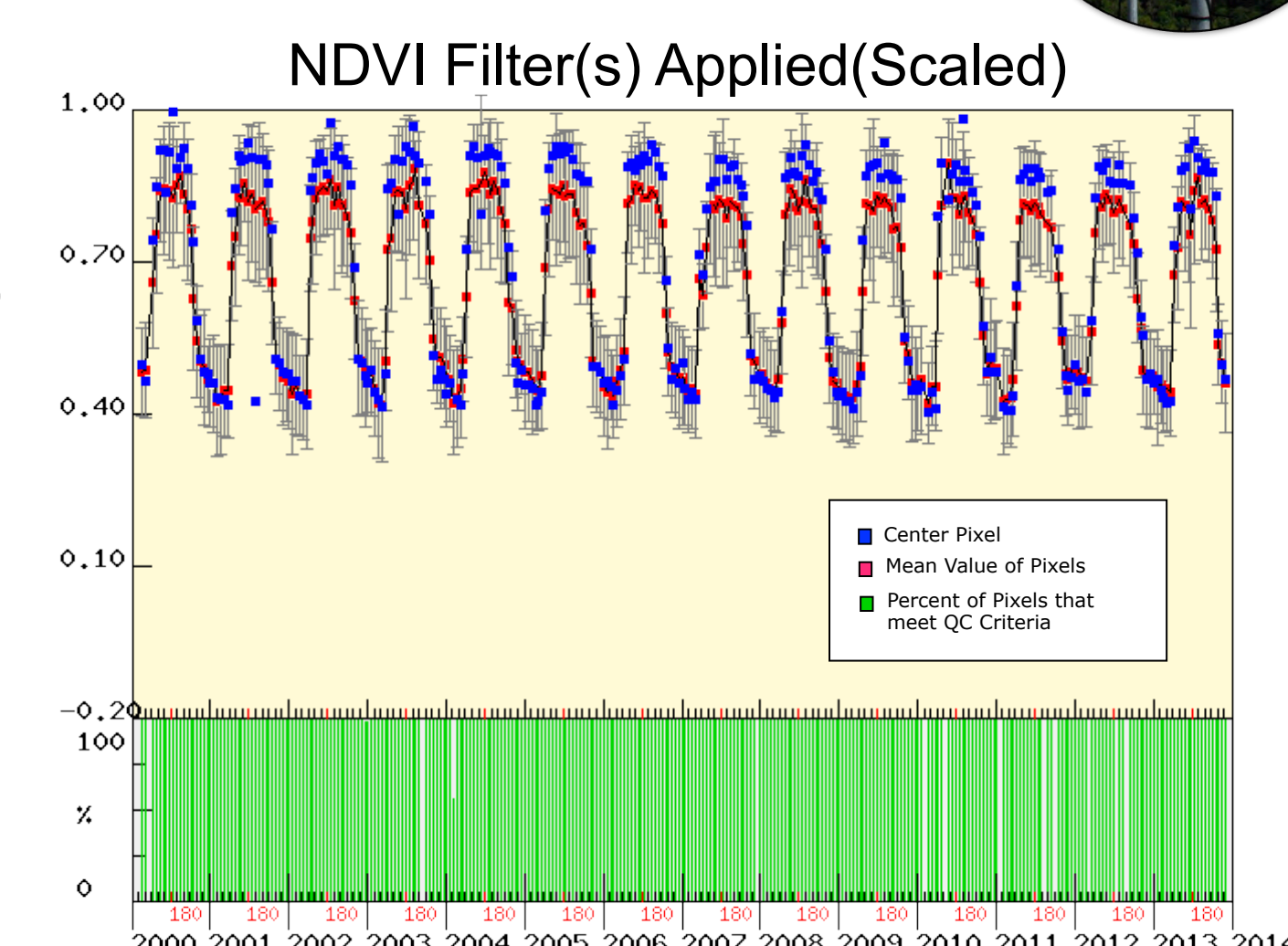
Grid Visualization for individual composite period  
**Advanced Version**  
(User defined QC setting)



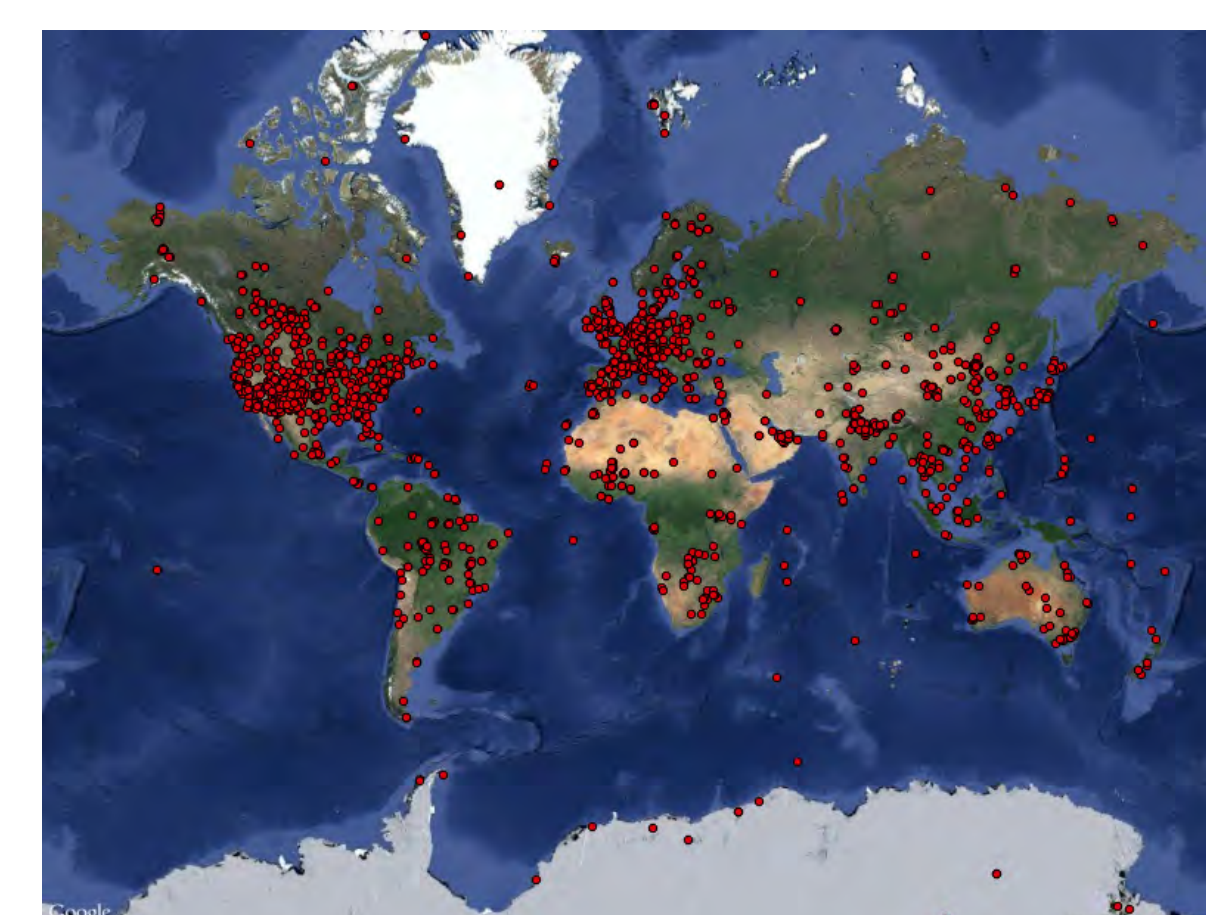
Time Series  
**Basic Version**  
(Default QC setting)



Time Series  
**Advanced Version**  
(User defined QC setting)



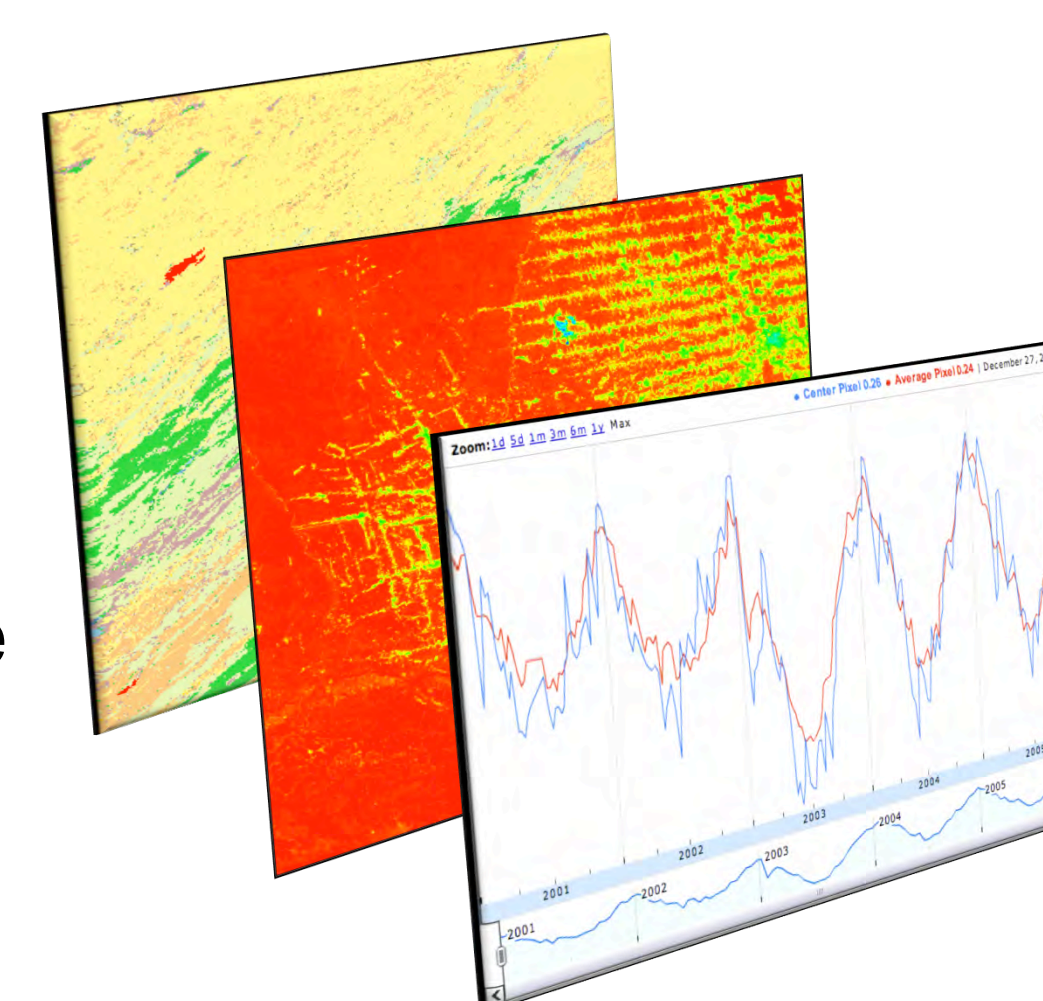
Location of Updated Field Sites



## Global Subsets

<http://daac.ornl.gov/modisglobal>

- User places an order for subsets up to 201 km through a Web interface
- The tool sends an email message containing a URL to access the order output
- Subsetting includes generation of time series data file, graphs, and statistics
- Provides several visualization options for the time series data



## Web Service

<http://daac.ornl.gov/modiswebservice>

- Uses Simple Object Access Protocol (SOAP) Web service standard
- Programmatically retrieve subsets
- Real time data delivery
- Integrate with client side tools
- Retrieve subsets for several locations
- Connect with workflow software

## Ecosystem Studies and Applications



MODIS subsets can be used in modeling vegetation and bird phenology. Citizen science data of vegetation and bird occurrence can be combined with MODIS data for modeling habitat/seasonality



Correlating honey production to vegetation phenology. Trends in plant-pollinator relationships affected by earlier or delayed spring green-up



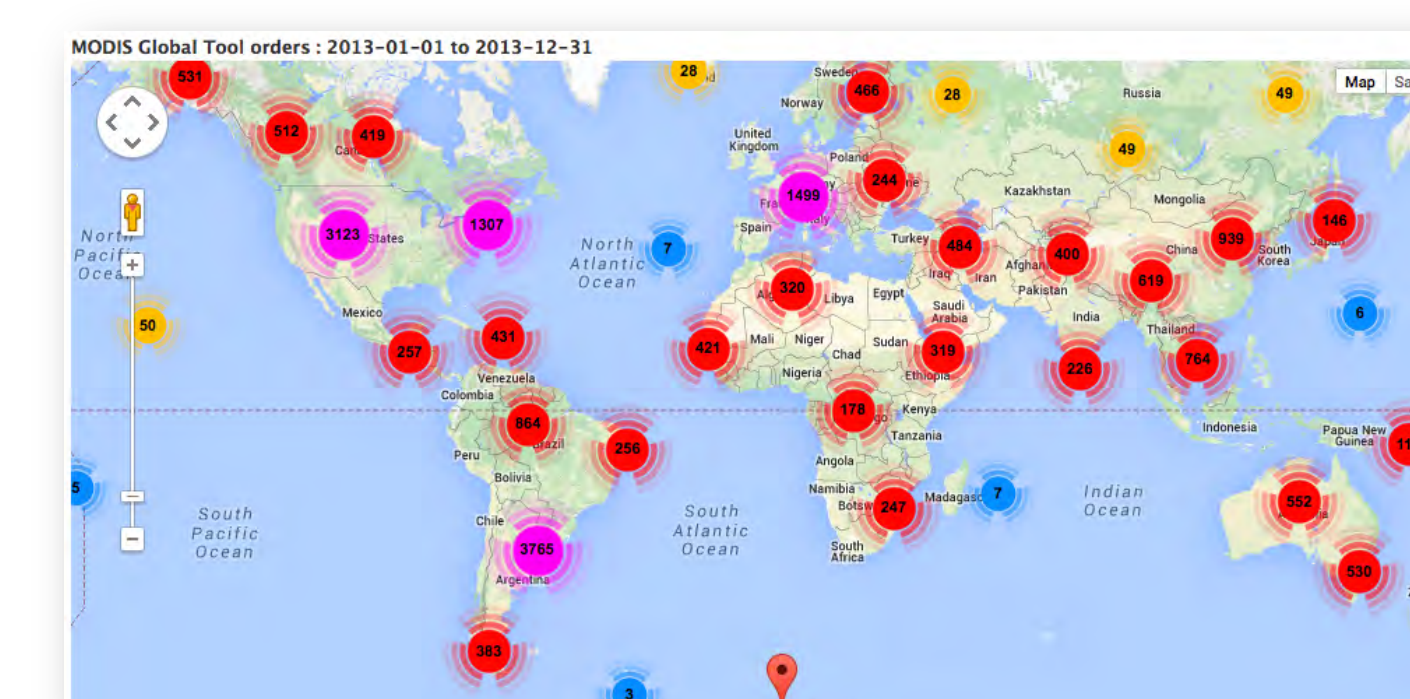
Field site estimates such as gross primary production from energy flux tower sites can be compared or validated using MODIS data provided by the ORNL DAAC tools



The ORNL DAAC MODIS tools are easy to use and have been used in graduate and undergraduate classroom education to illustrate the use of remote sensing data for scientific research

<http://daac.ornl.gov/MODIS/MODIS-menu/exercises.html>

## Global Tool Usage

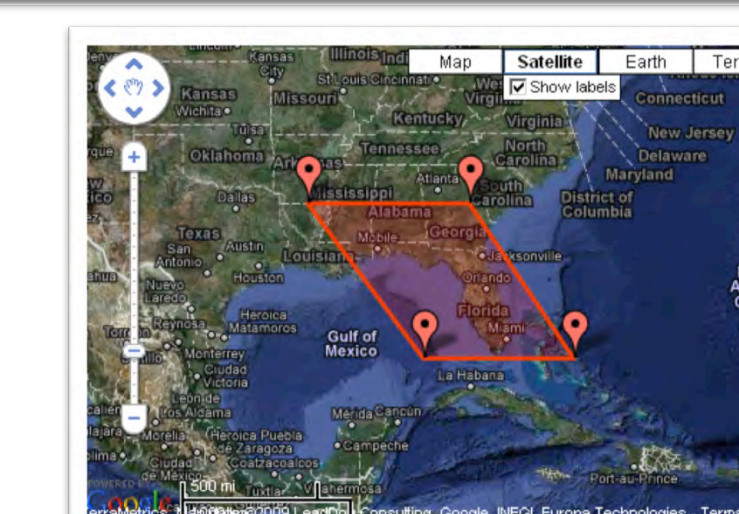


Product	Number of orders
MOD13Q1	11127
MOD13A2	1777
MOD15A2	1702
MOD08A1	1430
MCD43A1	1073
MCD12Q2	908
MOD13Q2	836
MOD17A2_S1	574
MOD17A2	415
MCD43A4	294
MOD15A2	266
MOD17A2	197
MOD08A1	140
MOD15A2GFS	14

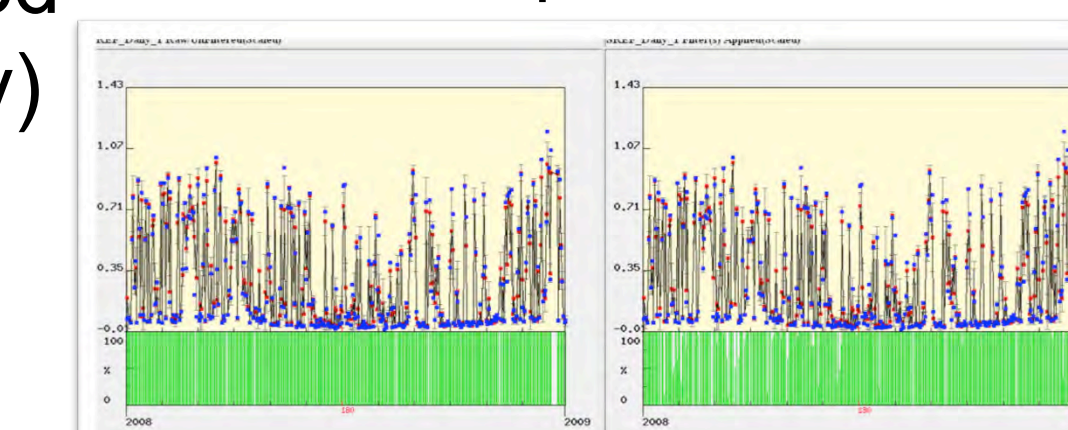
## Future Updates

<http://daacmodis1.ornl.gov/modisglobal>

- Subset size up to 501 km  
June 2014
- Interface improvements  
June 2014
- Subsets from pre-defined polygons (State, County)  
Sep 2014
- Summary statistics plot  
Sep 2014
- Daily surface reflectance  
(as available, Collection 6)



Subsets up to 501 km



Bulk order subsets

Support for daily data

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